

What is claimed:

5 ~~503/1~~ 1. An isolated nucleic acid molecule, comprising a gene located on *Arabidopsis thaliana* chromosome 1, the disruption of which is associated with a failure to maintain homolog attachment during meiotic prophase I.

2. The nucleic acid molecule of claim 1, which encodes a protein having a cyclin domain.

10 ~~503/2~~ 3. The nucleic acid molecule of claim 2, wherein the gene is composed of exons that form an open reading frame having a sequence that encodes a polypeptide approximately 578 amino acids in length.

15 ~~503/3~~ 4. A cDNA molecule comprising the exons of the nucleic acid of claim 3.

~~503/4~~ 5. The nucleic acid molecule of claim 3, wherein the open reading frame encodes an amino acid sequence at least 70% identical to the cyclin domain of SEQ ID NO:2.

20 6. The nucleic acid molecule of claim 3, wherein the open reading frame encodes an amino acid sequence which is at least 50% identical to SEQ ID NO:2 over the entire length of SEQ ID NO:2.

25 7. The nucleic acid molecule of claim 6, wherein the open reading frame encodes SEQ ID NO:2.

~~503/5~~ 8. The nucleic acid molecule of claim 6, which comprises an open reading frame having the sequence set forth in SEQ ID NO:1.

30 9. An oligonucleotide between about 15 and 100 nucleotides in length, which specifically hybridizes with either strand of the nucleic acid molecule of claim 1.

10. A polypeptide produced by expression of the nucleic acid molecule of claim 1.

11. Antibodies immunologically-specific for the polypeptide of claim

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12. A vector for transforming a plant cell, comprising the nucleic acid molecule of claim 1.

13. A transformed plant cell comprising the vector of claim 12.

14. An isolated nucleic acid molecule comprising an open reading frame of a gene located on Arabidopsis chromosome 1, the open reading frame having a sequence selected from the group consisting of:

- a) SEQ ID NO:1;
- b) a sequence that is at least 80% identical to SEQ ID NO:1;
- c) a sequence encoding a polypeptide having SEQ ID NO:2;
- d) a sequence encoding a polypeptide having a at least 50% identity to

SEQ ID NO:2;

e) a sequence encoding a polypeptide having at least 70% identity to the cyclin domain of SEQ ID NO:2; and

f) a nucleotide sequence that hybridizes with SEQ ID NO:1 under stringent conditions,

wherein stringent conditions are

hybridizing for at least 6 hours at 37°C in 5X SSC, 5X Denhardt's reagent, 1.0% SDS, 100 µg/ml denatured fragmented salmon sperm DNA, 0.05% sodium pyrophosphate; and

washing once for 5 minutes at room temperature in 2X SSC and 1% SDS, once for 15 minutes at room temperature in 2X SSC and 0.1% SDS, once for 30 minutes at 37°C in 1X SSC and 1% SDS and four times for 30 minutes each at 42°C in 1X SSC and 1% SDS.

15. A polypeptide, produced by the expression of the isolated nucleic acid molecule of claim 14.

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16. Antibodies immunologically specific for the polypeptide of claim 15.

17. A vector for transforming a plant cell, comprising the nucleic acid molecule of claim 14.

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18. A transformed plant cell comprising the vector of claim 17.

19. A plant comprising a mutation in an SDS gene, wherein said mutation confers an inability to maintain homolog attachment during meiosis.

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20. A plant gene promoter comprising a nucleic acid sequence which when operatively linked to a cDNA sequence, confers meiosis-specific expression on said cDNA sequence.

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21. An isolated nucleic acid comprising an SDS promoter, wherein said promoter comprises the sequence set forth in SEQ ID NO:3.

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22. An isolated nucleic acid comprising a genomic SDS sequence, wherein said sequence is at least 70% identical to that of SEQ ID NO:4, over the entire length of SEQ ID NO:4.

23. The isolated nucleic acid of claim 22, wherein said sequence comprises the polynucleotide sequence of SEQ ID NO:4.

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24. A plant cell comprising a mutation in an SDS gene, wherein such mutation confers onto said plant cell at least one of the phenotypes of sterility and inability to produce pollen.

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